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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,427	08/23/2001	Ali Bani-Hashemi	2001 P 05443 US	1376

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Siemens Corporation
Intellectual Property Department
186 Wood Avenue South
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EXAMINER	
BRIER, JEFFERY A	
ART UNIT	PAPER NUMBER
2628	
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08/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/818,427	BANI-HASHEMI ET AL.	
	Examiner	Art Unit	
	Jeffery A. Brier	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13,16-23,25,26,29-35 and 37-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13,16-23,25,26,29-35 and 37-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/12/2007 has been entered.

Response to Amendment

2. The amendment filed on 7/12/2007 has been entered. The amendments to claims 13, 16, and 23 overcomes the 35 USC 112 second paragraph issues raised in the Final Rejection mailed on 3/12/2007.

Response to Arguments

3. Applicant's arguments at pages 10-12 filed 7/12/2007 concerning the 35 USC 102 rejections based applicants admitted prior art have been fully considered and are deemed to be persuasive since the bulls eye discussed at page 35 appears to be part of the fluoro-guided system.

4. Applicant's arguments filed 7/12/2007 concerning the 35 USC 102 rejections based Kienzle have been fully considered, but, they are deemed not to be persuasive because Kienzle may track the real instrument or patient, however, this is done so the

real instrument and virtual graphical guides may be properly displayed, see paragraphs 53- 55, while still requiring the surgeon to properly align the real instrument with the aid of the real and virtual features displayed to the surgeon.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 13 and 16-22, 42, and 43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13:

At lines 5, 6, 12, and 24 "its" and "it" is claimed however this claim limitation does not clearly refer a previous claim limitation.

Claim 16:

At line 29 "it" is claimed however this claim limitation does not clearly refer a previous claim limitation. Dependent claims 17-22, 42, and 43 do not correct this issue.

Claim 19:

This claim claims "makes the augmented reality line of sight coincide with the path by moving into a position where said target point and said at least one graphical axis marker line up" but does not claim what is being moved into a position to make the line of sight coincide with the path. Thus, the metes and bounds of the claim is unclear.

A proper prior art analysis of the claims cannot be made because the metes and bounds of the claims are not definite and because the specification does clarify this claims. Thus, a prior art rejection or an indication of allowability cannot be made with the currently pending claims. In re Steele, 305 F.2d 859,134 USPQ 292 (CCPA 1962) (it is improper to rely on speculative assumptions regarding the meaning of a claim and then base a rejection under 35 U.S.C. 103 on these assumptions).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 13, 16-18, 22, 23, 31-35, 37, and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kienzle, III. US PGPub application no. 2002/

0077540, in view of Frank Sauer, et al., Augmented Workspace: designing an AR testbed, Proceedings and ACM International Symposium on Augmented Reality, 2000, October 5-6, 2000, pages 47-53, cited on the PTO-892 mailed on 3/26/2004 is referenced in this application in the Background at page 3 and in the Detailed Description in the paragraph spanning pages 17 and 18.

Claim 13:

Kienzle teaches a method for augmented reality guided instrument positioning, comprising the steps of:

rendering at least one graphics path guide for indicating a path for a real instrument to follow to a target, the graphics path guide being constructed in a way that it frames the path so as not to obstruct a view of a central part of the real instruments if the real instruments along its axis in correct alignment to said path (Paragraphs 42-46 describes and figures 7 and 8 show virtual probe tip portion 156 as a dashed outline which frames the path the instrument should follow to reach the target159. Paragraph 44 discusses alternative graphic representations of the probe.);

Kienzle does not fully teach displaying the rendered at least one graphics path guide on a display overlaid onto a direct optical or video view that contains said real instrument and a real object, which includes said target (However, the Augmented Workspace article teaches in section 6 a video see through HUD and in sections 9 and 10 superimposing graphic guides onto the video of the real instrument and the real object. The article also discusses optical see through system in section 3.);

The combination of Kienzle and the Augmented Workspace article further teaches:

a user performing the following steps:

moving said real instrument, observed in said video view, to align it with the at least one graphic path guide, observed on the display that show the at least one graphic guide overlaid onto said view of said real instrument and said real object (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.)

aligning the real instrument with the path by determining when the at least one graphics path guide frames the path so that a view of a central part of the real instrument is not obstructed by the at least one graphics path guide (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.); and

moving said real instrument along the path so that a front portion of said real instrument is inserted into the object until its tip reaches said target (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.).

It would have been obvious to one of ordinary skill in the art to display the rendered at least one graphics path guide on Kienzle's display overlaid onto a direct optical or video view that contains said real instrument and a real object in view of the Augmented Workspace article because the article teaches in sections 1 and 10 that augmented reality with video of the real scene provides beneficial results.

Claim 16:

Kienzle teaches a method for augmented reality guided instrument positioning, comprising the steps of:

defining a target point within a real object (figures 7 and 8, target 159);

defining a path to reach the target point with a real instrument (Paragraphs 42-46 describes and figures 7 and 8 show virtual probe tip portion 156 as a dashed outline which frames the path the instrument should follow to reach the target 159. Paragraph 44 discusses alternative graphic representations of the probe.);

Kienzle does not fully teach rendering a graphical representation of the path in the form of at least one graphical axis marker (Kienzle: 156) on a display overlaid onto a direct optical or video view of a real scene that comprises said real instrument, said real object, and includes said target point, so that a user can perceive said real instrument and said at least one graphical axis marker and their spatial relationship in an augmented reality view (However, the Augmented Workspace article teaches in section 6 a video see through HUD and in sections 9 and 10 superimposing graphic guides onto the video of the real instrument and the real object.),

The combination of Kienzle and the Augmented Workspace article further teaches:

a user performing the following steps:

aligning said user's augments reality line-of-sight with the at least one graphical axis marker so that said path to reach said target point with the real instrument is

aligned along said augmented reality line-of-sight (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.)

aligning the real instrument to the path by aligning the real instrument with the augmented reality line-of-sight towards the target point (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.); and

moving the real instrument along the path towards the target point while keeping it aligned with the augmented reality line-of-sight (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.).

It would have been obvious to one of ordinary skill in the art to display the rendered at least one graphics path guide on Kienzle's display overlaid onto a direct optical or video view that contains said real instrument and a real object in view of the Augmented Workspace article because the article teaches in sections 1 and 10 that augmented reality with video of the real scene provides beneficial results.

Claim 17:

Both Kienzle and the article teach a real instrument that has an axis marker by being a needle.

Claim 18:

Both Kienzle and the article teach a real instrument that has an axis marker by being a needle. Thus, it is added.

Claim 22:

Kienzel teaches the method according to claim 16, wherein the at least one identified graphical axis marker comprises at least two axis markers for controlling

alignment of the real instrument along a line of sight (see figures 7 and 8, virtual probe tip portion 156 is a dashed outline having two axis markers).

Claim 42:

Kienzel teaches the method of claim 16 wherein the graphical target point and the graphical axis marker are designed such that information corresponding to the distance between the actual instrument and the point on the actual target can be directly observed from an alignment of the graphical target point and the graphical axis marker by graphically displaying the instrument as it is moved by the user relative to the target which shows the distance graphically.

Claim 23:

Kienzle teaches a method for augmented reality guided instrument positioning, comprising the steps of:

defining a real target point within a real object (figures 7 and 8, target 159);

defining a path to reach the target point within said real object (Paragraphs 42-46 describes and figures 7 and 8 show virtual probe tip portion 156 as a dashed outline which frames the path the instrument should follow to reach the target 159. Paragraph 44 discusses alternative graphic representations of the probe. The dashed outline defines a path to reach the real target within the patient.);

tracking a pose of a real instrument with respect to a pose of the real object (Paragraphs 42-46 and 53- 55);

Kienzle does not fully teach rendering a graphical representation of the real instrument and the path to obtain a virtual instrument and a graphical virtual guide on a

display, the graphical representation being rendered with respect to a virtual viewpoint from which a virtual line of sight coincides with a virtual path for the virtual instrument to follow during a positioning of the real insure to the real target point, the graphical virtual guide correspond to the path, the virtual instrument comprising a 3D structure for line of sight alignment, the 3D structure comprising a plurality of markers centered on a distributed along an axis of the virtual instrument (However, the Augmented Workspace article teaches in section 6 a video see through HUD and in sections 9 and 10 superimposing graphic guides onto the video of the real instrument and the real object. The article also discusses optical see through system in section 3.);

The combination of Kienzle and the Augmented Workspace article further teaches:

aligning the virtual instrument along the virtual fine of sight according to the graphical virtual guide in order to accordingly align the real instrument along the path (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.); and

moving the real instrument by a user in response to viewing the virtual instrument and said graphical virtual guide on the display, the real instrument moving along the path towards the real target point keeping the correct alignment by observing and keeping in the alignment with the virtual instrument and graphical virtual guide (Kienzle: paragraphs 39-46 Article: sections 9 and 10 and figure 7.)

It would have been obvious to one of ordinary skill in the art to display the rendered at least one graphics path guide on Kienzle's display overlaid onto a direct optical or video view that contains said real instrument and a real object in view of the

Augmented Workspace article because the article teaches in sections 1 and 10 that augmented reality with video of the real scene provides beneficial results.

Claim 31:

Kienzel teaches the method of claim 23, wherein the step of aligning the virtual instrument further comprises the step of choosing an orientation of the graphical representation around the virtual line of sight according to a pose of a user with respect to the real target point (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 32:

Kienzel teaches the method of claim 31, further comprising the step of determining the orientation such that east, west, north, and south correspond to right, left, forward, and backward, respectively, for the pose of the user in which the user faces the real target point, said determining step based on a selection (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 33:

Kienzel teaches the method of claim 31, wherein the orientation is dynamically adjusted according to a change of the pose of the user (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 34:

Kienzel teaches the method of claim 32, wherein the selection is dynamically adjusted with respect to the pose of the user (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 35:

Kienzel teaches the method of claim 23 wherein the rendering step further comprises the step of rendering graphical information about a distance between the actual instrument and the point on the actual target, the graphical information about the distance being overlaid onto the graphical representation by graphically displaying the instrument as it is moved by the user relative to the target which shows the distance graphically.

Claim 37:

Kienzel teaches the method of claim 23 wherein the virtual target point and the virtual instrument are designed such that information corresponding to the distance between the actual instrument and the point on the actual target can be directly observed from an alignment of the virtual target point and the virtual instrument by graphically displaying the instrument as it is moved by the user relative to the target which shows the distance graphically.

Claim 40:

Kienzel teaches the method of claim 23, wherein the graphical representation from the virtual viewpoint is combined with another graphical representation from another virtual viewpoint looking at the virtual path from a side thereof with reference to figures 4-7, 11, and 12.

Claim 41:

Kienzel teaches the method of claim 23, wherein said graphical representation from the virtual viewpoint is combined with an augmented reality view with reference to figures 4-7, 11, and 12.

10. Claims 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kienzle, III. US PGPub application no. 2002/ 0077540, in view of Frank Sauer, et al., Augmented Workspace: designing an AR testbed, Proceedings and ACM International Symposium on Augmented Reality, 2000, October 5-6, 2000, pages 47-53, cited on the PTO-892 mailed on 3/26/2004 is referenced in this application in the Background at page 3 and in the Detailed Description in the paragraph spanning pages 17 and 18 and in view of applicants admission of the prior art and motivation of using aiming aids of guns with instrument guidance found at page 38 lines 7-16.

Kienzel does not teach the graphical axis marker comprises an intersection of at least two lines, the intersection to be centered on the axis of the actual instrument for correct alignment.

It would have been obvious to one of ordinary skill in the art to use the feature of gun aiming, the cross, and apply it to augmented reality aiming of real instruments because this will give the user a good idea of the alignment of the real instruments with the real target.

11. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kienzle, III. US PGPub application no. 2002/ 0077540, in view of Frank Sauer, et al., Augmented Workspace: designing an AR testbed, Proceedings and ACM International Symposium on Augmented Reality, 2000, October 5-6, 2000, pages 47-53, cited on the PTO-892 mailed on 3/26/2004 is referenced in this application in the Background at page 3 and in the Detailed Description in the paragraph spanning pages 17 and 18.

Kienzel does not teach rendering by using a virtual camera with a wide angle lens.

Page 50 line 24 to page 51 line 4 of applicants specification does not give a reason for rendering by using a virtual camera with a wide angle lens.

It would have been obvious to one of ordinary skill in the art to render by using a virtual camera with a wide angle lens because this is one of many ways to render the graphical images and because applicant did not give any reason for choosing this type of rendering.

12. Claims 20, 25, 26, 29, 30, 39, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kienzle, III. US PGPub application no. 2002/ 0077540, in view of Frank Sauer, et al., Augmented Workspace: designing an AR testbed, Proceedings and ACM International Symposium on Augmented Reality, 2000, October 5-6, 2000, pages 47-53, cited on the PTO-892 mailed on 3/26/2004 is referenced in this application in the Background at page 3 and in the Detailed Description in the paragraph spanning pages 17 and 18 and in view of applicants admission of the prior art and motivation of using aiming aids of guns with instrument guidance found at page 38 lines 7-16 and in

view of the prior art bulls eye discussed at page 35 lines 12-20 and page 35 line 26 to page 36 line 2.

A bulls eye has concentric circular shapes having different diameters about and centered on an axis and this configuration together with the real instrument achieves a pre-defined configuration when the real instrument reaches the real target point.

Each of these claims have varying degrees of limitations but all these claims are rejected based upon the bulls eye feature and based upon aiming aids of guns.

It would have been obvious to one of ordinary skill in the art to use a bulls eye type of axis marker as a graphical aid in the augmented and virtual environment of Kienzle as modified by the Augmented Workspace article because circles and concentric circles provide a art recognized means of allowing a user to align work pieces, fire arms, etc. to a target point.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tuceryan, M.; Greer, D.S.; Whitaker, R.T.; Breen, D.E.; Crampton, C.; Rose, E.; Ahlers, K.H.; Calibration Requirements and Procedures for a Monitor-Based Augmented Reality System, September 1995, vol. 1, no. 3, pages 255-273, is referenced in this application in the Background at page 3 and in the Detailed Description in the paragraph spanning pages 17 and 18.

Tuceryan, M.; Navab, N.; Single point active alignment method (SPAAM) for optical see-through HMD calibration for AR, 5-6 Oct. 2000, pages 149-158, is

referenced in this application in the Background at page 3 and in the Detailed Description in the paragraph spanning pages 17 and 18.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A Brier whose telephone number is (571) 272-7656. The examiner can normally be reached on M-F from 7:30 to 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (571) 272-7664. The fax phone Number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jeffery A. Brier/
Primary Examiner, Division 2628